

What is claimed is:

1 1. A method for converting initial digital video data having a format including an
2 input sequence of pixels extending in a first direction at a first spacing into output digital
3 video data having a format including an output sequence of pixels extending in said first
4 direction at a second spacing, different from said first spacing, wherein said method
5 comprises:

6 transforming coordinate values of a first sequence of pixels within said input
7 sequence of pixels into a first transformation function by applying a decorrelating
8 transform to said coordinate values of said first sequence of pixels, wherein applying said
9 decorrelating transform to said coordinate values of said first sequence of pixels removes a
10 statistical correlation between coordinate values of sequentially adjacent pixels within said
11 first sequence of pixels; and

12 determining coordinate values for generating a second sequence of pixels forming
13 a portion of said output sequence of pixels by evaluating, at locations of pixels
14 sequentially adjacent in said first direction at said second spacing, a function formed by
15 applying an inverse of said decorrelating transform to said first transformation function.

1 2. The method of claim 1, wherein said first direction is along a scan line along a
2 frame within said initial digital video data.

1 3. The method of claim 1, wherein said first direction is perpendicular to a scan line
2 along a frame within said initial digital video data.

1 4. The method of claim 1, wherein said first direction extends among sequentially
2 adjacent frames within said initial digital video data.

1 5. The method of claim 1, wherein said decorrelating transform is a discrete cosine
2 transform.

1 6. The method of claim 1, additionally comprising:

2 separating said input sequence of pixels into said first sequence of pixels and an
3 additional sequence of pixels at a location corresponding to a visible discontinuity within
4 said input sequence of pixels;

5 transforming coordinate values of said additional sequence of pixels into a second
6 transformation function by applying said decorrelating transform to said coordinate values
7 of said additional sequence of pixels; and

8 determining coordinate values for a third sequence of pixels forming a portion of
9 said output sequence of pixels by evaluating, at locations of pixels sequentially adjacent in
10 said first direction at said second spacing, a function formed by applying an inverse of said
11 decorrelating transform to said additional transformation function.

1 7. The method of claim 6, wherein said location corresponding to a visible
2 discontinuity is determined to occur at a location of adjacent pixels having a difference in a
3 coordinate value greater than eleven times a magnitude of a difference in said coordinate
4 value causing a visible difference between said adjacent pixels.

1 8. The method of claim 6, additionally comprising:

2 generating an interpolation function extending between coordinate values at
3 adjacent ends of said second and third sequences of pixels; and

4 determining coordinate values for generating a sequence of pixels to extend within
5 said output sequence of pixels between said second and third sequences of pixels.

1 9. The method of claim 1, additionally comprising

2 locating a visible discontinuity within said input sequence of pixels;

3 generating a leveling function to subtract from coordinate values of said input
4 sequence of pixels to remove said visible discontinuity;

5 subtracting said leveling function from coordinate values of said input sequence of

6 pixels to form said coordinate values of said first sequence of pixels; and
7 adding said leveling function to said coordinate values determined by evaluating
8 said function formed by applying an inverse to said decorrelating transform to said first
9 transformation function.

1 10. The method of claim 9, wherein said visible discontinuity is determined to occur at
2 a location of adjacent pixels having a difference in a coordinate value greater than eleven
3 times a magnitude of a difference in said coordinate value causing a visible difference
4 between said adjacent pixels.

1 11. A method for converting a sequence of initial digital video frames having a format
2 including a first frame spacing to a sequence of output digital video frames having a
3 format including a second frame spacing, different from said first frame spacing, wherein
4 each of said initial digital video frames includes a plurality of lines, and wherein each of
5 said lines includes a plurality of pixel positions, and wherein said method comprises, for an
6 input sequence of pixels extending through said sequence of initial digital video frames at
7 each of said pixel positions in each of said lines, performing the following steps,
8 performing the following steps:

9 transforming coordinate values of a first sequence of pixels within said input
10 sequence of pixels into a first transformation function by applying a decorrelating
11 transform to said coordinate values of said first sequence of pixels, wherein applying said
12 decorrelating transform to said coordinate values of said first sequence of pixels removes a
13 statistical correlation between coordinate values of sequentially adjacent pixels within said
14 first sequence of pixels; and

15 determining coordinate values for generating a second sequence of pixels forming
16 a portion of an output sequence of pixels by evaluating, at locations of pixels sequentially
17 adjacent at said second frame spacing, a function formed by applying an inverse of said
18 decorrelating transform to said first transformation function.

1 12. The method of claim 11, additionally comprising:
2 determining locations of visible discontinuities in each said input sequence of
3 pixels;
4 at each location of one of said visible discontinuities, separating said input
5 sequence of pixels into an additional sequence of pixels;
6 transforming coordinate values of each said additional sequence of pixels into a
7 second transformation function by applying said decorrelating transform to said coordinate
8 values of said additional sequence of pixels; and
9 determining coordinate values for a third sequence of pixels forming a portion of
10 said output sequence of pixels by evaluating, at locations of pixels sequentially adjacent in
11 said first direction at said second spacing, a function formed by applying an inverse of said
12 decorrelating transform to said additional transformation function.

1 13. The method of claim 11, additionally comprising
2 determining locations of visible discontinuities in said input sequences of pixels;
3 generating a leveling function to subtract from coordinate values of said input
4 sequence of pixels to remove each of said visible discontinuities;
5 subtracting said leveling function from coordinate values of said input sequence of
6 pixels to form said coordinate values of said first sequence of pixels; and
7 adding said leveling function to said coordinate values determined by evaluating
8 said function formed by applying an inverse to said decorrelating transform to said first
9 transformation function.

1 14. A method for converting a sequence of initial digital video frames having an initial
2 format into a sequence of output digital video frames having an output format, different
3 from said initial format, wherein said initial format includes a first pixel spacing between
4 adjacent pixels along scan lines, a first line spacing between adjacent scan lines, and a first
5 frame spacing between adjacent frames, wherein said output format includes a second
6 pixel spacing between adjacent pixels along scan lines, a second line spacing between

7 adjacent scan lines, and a second frame spacing between adjacent frames, and wherein said
8 method comprises, for an input sequence of pixels extending along each scan line in each
9 frame within said initial digital video frames:

10 transforming coordinate values of a first sequence of pixels within said input
11 sequence of pixels into a first transformation function by applying a decorrelating
12 transform to said coordinate values of said first sequence of pixels, wherein applying said
13 decorrelating transform to said coordinate values of said first sequence of pixels removes a
14 statistical correlation between coordinate values of sequentially adjacent pixels within said
15 first sequence of pixels;

16 determining coordinate values by evaluating, at locations of pixels sequentially
17 adjacent at said second pixel spacing, a function formed by applying an inverse of said
18 decorrelating transform to said first transformation function; and

19 generating a first intermediate sequence of digital video data including scan lines
20 generated using said coordinate values determined by evaluating said function formed by
21 applying an inverse of said decorrelating transform to said first transformation function.

1 15. The method of claim 14, additionally comprising:

2 determining locations of visible discontinuities in each said input sequence of
3 pixels;

4 at each location of one of said visible discontinuities, separating said input
5 sequence of pixels into an additional sequence of pixels;

6 transforming coordinate values of each said additional sequence of pixels into an
7 additional transformation function by applying said decorrelating transform to said
8 coordinate values of said additional sequence of pixels; and

9 determining coordinate values for a third sequence of pixels forming a portion of
10 said first intermediate sequence of video data by evaluating, at locations of pixels
11 sequentially adjacent in along said scan line at said second pixel spacing, a function formed
12 by applying an inverse of said decorrelating transform to said additional transformation
13 function.

1 16. The method of claim 14, additionally comprising
2 determining locations of visible discontinuities in each said input sequence of
3 pixels;
4 generating a leveling function to subtract from coordinate values of said input
5 sequence of pixels to remove each of said visible discontinuities;
6 subtracting said leveling function from coordinate values of said input sequence of
7 pixels to form said coordinate values of said first sequence of pixels; and
8 adding said leveling function to said coordinate values determined by evaluating
9 said function formed by applying an inverse to said decorrelating transform to said first
10 transformation function.

1 17. The method of claim 14, additionally comprising for an input sequence of pixels
2 extending from each pixel position along a scan line in a direction perpendicular to said
3 scan line through each scan line in each frame within said first intermediate sequence of
4 digital video data:

5 transforming coordinate values of a second sequence of pixels within said input
6 sequence of pixels into a second transformation function by applying a decorrelating
7 transform to said coordinate values of said first sequence of pixels, wherein applying said
8 decorrelating transform to said coordinate values of said first sequence of pixels removes a
9 statistical correlation between coordinate values of sequentially adjacent pixels within said
10 first sequence of pixels;

11 determining coordinate values by evaluating, at locations of pixels sequentially
12 adjacent at said second pixel spacing, a function formed by applying an inverse of said
13 decorrelating transform to said second transformation function; and

14 generating a second intermediate sequence of digital video data including pixels
15 generated using said coordinate values determined by evaluating said function formed by
16 applying an inverse of said decorrelating transform to said second transformation function.
17

1 18. The method of claim 17, additionally comprising:
2 determining locations of visible discontinuities in each said input sequence of
3 pixels;
4 at each location of one of said visible discontinuities, separating said input
5 sequence of pixels into an additional sequence of pixels;
6 transforming coordinate values of each said additional sequence of pixels into an
7 additional transformation function by applying said decorrelating transform to said
8 coordinate values of said additional sequence of pixels; and
9 determining coordinate values for a third sequence of pixels forming a portion of
10 said second intermediate sequence of digital video data by evaluating, at locations of
11 pixels sequentially adjacent in along said input sequence of pixels at said second pixel
12 spacing, a function formed by applying an inverse of said decorrelating transform to said
13 additional transformation function.

1 19. The method of claim 17, additionally comprising
2 determining locations of visible discontinuities in each said input sequence of
3 pixels;
4 generating a leveling function to subtract from coordinate values of said input
5 sequence of pixels to remove each of said visible discontinuities;
6 subtracting said leveling function from coordinate values of said input sequence of
7 pixels to form said coordinate values of said second sequence of pixels; and
8 adding said leveling function to said coordinate values determined by evaluating
9 said function formed by applying an inverse to said decorrelating transform to said first
10 transformation function.

1 20. The method of claim 17, additionally comprising for an input sequence of pixels
2 extending from each pixel position along a scan line in a direction perpendicular to a frame
3 within said second intermediate sequence of digital video data, said input sequence of

4 pixels extending through each frame within said second intermediate sequence of digital
5 video data:

6 transforming coordinate values of a third sequence of pixels within said input
7 sequence of pixels into a third transformation function by applying a decorrelating
8 transform to said coordinate values of said first sequence of pixels, wherein applying said
9 decorrelating transform to said coordinate values of said first sequence of pixels removes a
10 statistical correlation between coordinate values of sequentially adjacent pixels within said
11 first sequence of pixels;

12 determining coordinate values by evaluating, at locations of pixels sequentially
13 adjacent at said second frame spacing, a function formed by applying an inverse of said
14 decorrelating transform to said third transformation function; and

15 generating said sequence of output digital video frames including pixels generated
16 from said coordinate values determined by evaluating said function formed by applying an
17 inverse of said decorrelating transform to said third transformation function.

1 21. The method of claim 20, additionally comprising:

2 determining locations of visible discontinuities in each said input sequence of
3 pixels;

4 at each location of one of said visible discontinuities, separating said input
5 sequence of pixels into an additional sequence of pixels;

6 transforming coordinate values of each said additional sequence of pixels into an
7 additional transformation function by applying said decorrelating transform to said
8 coordinate values of said additional sequence of pixels; and

9 determining coordinate values for a third sequence of pixels forming a portion of
10 said sequence of output digital video frames by evaluating, at locations of pixels
11 sequentially adjacent in along said input sequence of pixels at said second frame spacing, a
12 function formed by applying an inverse of said decorrelating transform to said additional
13 transformation function.

1 22. The method of claim 20, additionally comprising
2 determining locations of visible discontinuities in each said input sequence of
3 pixels;
4 generating a leveling function to subtract from coordinate values of said input
5 sequence of pixels to remove each of said visible discontinuities;
6 subtracting said leveling function from coordinate values of said input sequence of
7 pixels to form said coordinate values of said third sequence of pixels; and
8 adding said leveling function to said coordinate values determined by evaluating
9 said function formed by applying an inverse to said decorrelating transform to said first
10 transformation function.